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#### Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
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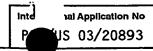
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: VAPOR DEPOSITED CATALYSTS AND THEIR USE IN FUEL CELLS

(57) Abstract: The invention provides a catalyst useful in a proton exchange membrane containing fuel cell for the electrooxidation of fuels prepared by the chemical activation of vapor deposited substantially semicrystalline PtXaAlb onto a substrate, wherein X is selected from the group consisting of Ru, Rh, Mo, W, V, Hf, Zr, Nb and Co, and a is at least 0.001, and b is at least 0.85• (1+a), with the proviso that when a=1 and b=8, X is only selected from the group consisting of W, V, Hf, Zr, Nb, and Co. These catalysts have an onset voltage for the electrooxidation of methanol of less than about 240 mV versus a saturated calomel electrode (SCE). They are useful in making diffusion backing electrodes and catalyst coated membranes for use in fuel cells.



## INTERNATIONAL SEARCH REPORT



Relevant to claim No.



According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) C23C H01M IPC 7

Category ° Citation of document, with indication, where appropriate, of the relevant passages

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

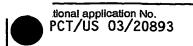
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Α	DENIS M C ET AL: "HIGH ENERGY BAPT AND PT-RU CATALYSTS FOR POLYM ELECTROLYTE FUEL CELLS AND THEIR TO CO"  JOURNAL OF APPLIED ELECTROCHEMIS CHAPMAN AND HALL. LONDON, GB, vol. 29, no. 8, August 1999 (199) pages 951-960, XP000854418 ISSN: 0021-891X the whole document	ER TOLERANCE TRY,	1-26	
A	US 5 872 074 A (DENIS MARIE-CHAN AL) 16 February 1999 (1999-02-16 the whole document	TAL ET )	1–26	
Α	US 5 767 036 A (HEINZ GERHARD E 16 June 1998 (1998-06-16) the whole document 	T AL)	1–26	
X Furt	her documents are listed in the continuation of box C.	χ Patent family members are listed	in annex.	
"A" document defining the general state of the art which is not considered to be of particular relevance  "E" earlier document but published on or after the international filing date  "L" document which may throw doubts on priority claim(s) or		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report		
7 April 2004		19/04/2004		
Name and mailing address of the ISA  European Patent Office, P.B. 5818 Patentlaan 2  NL - 2280 HV Rijswijk  Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  Fax: (+31-70) 340-3016		Authorized officer  Koessler, J-L		

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## INTERNATIONAL SEARCH REPORT

Int ial Application No
P S 03/20893

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT					
ategory °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.			
	US 2002/022160 A1 (SCHMIDT DAVID G) 21 February 2002 (2002-02-21) the whole document	1-26			
3.3					



Box I	Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)
This Inte	ernational Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:
1.	Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
2. X	Claims Nos.:  11 because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  see FURTHER INFORMATION sheet PCT/ISA/210
з. 🗌	Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).
Box II	Observations where unity of invention is lacking (Continuation of item 2 of first sheet)
This Inte	emational Searching Authority found multiple inventions in this international application, as follows:
1 [	As all required additional search fees were timely paid by the applicant, this International Search Report covers all
[_]	searchable claims.
2.	As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.	As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4.	No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the Invention first mentioned in the claims; it is covered by claims Nos.:
Remark	The additional search fees were accompanied by the applicant's protest.  No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 11

Present claim 11 relate to a catalyst defined by reference to a desirable characteristic or property, namely

having an onset voltage for methanol electrooxidation of less than about 240 mV versus a saturated calomel electrode

The claims cover all compounds having this characteristic or property, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such compounds. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the compound by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the compounds of claim 1.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

## **INTERNATIONAL SEARCH REPORT**

	information on patent family me	embers	P US	03/20893
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